Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

25X1

Page Denied

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

ON THE VARIATIONS OF THE BRIGHTNESS OF THE SATELITS.

It is well known, the satelits have the variable brightnesses.

The regular observations enable us to anser the following questions:

1) What is the rotation period?

2) What is the variation of the period?

3) What is the direction of an axis?

4) What is the change of it in the result of the precession?

The soviet astronomers obtained many observations of brightness of the second and third satelites.

The preliminary results are as follows.

1) The second Sputnik being observed at many stations, especially at Odessa, Gorky and Leningrad. The consideration of some observations made by V.Grigorevsky showed that this sputnik varied its brightness like a diffuse scattering body. A great number of light -curves were obtained. The changes of distance

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

from the sputnik to the observer, as well as the influence of the phase angle were taken into account.

After the complete discussion of these light-curves we expect to determine the direction of the axis of rotation.

The formula of the period of rotation is:

$$\text{Max JD.} = 2436187.65421 + 0.^{?}00120890756.E + 0.0001789\left(\frac{E}{10000}\right)^2$$

2) The rocket of the third satelite changes its brightness very rapidly and with great amplitude. We obtained very many moments of light-maxima. These moments are represented by the formula:

$$\text{Max} = 1958 \text{ July } 23{,}032135 + 0{,}0001011892.E + 0.0000687 \times 10^{-8}.E^2$$

During each passage of the rocket there are some definite deviations from the formula

$$M = M_{\odot} + P'.E,$$

where the P' is an temporary value of the period. These deviations enable us to find out the direction of the axis.

We suppose that:

a) The shape of the rocket is a cillindrical one.

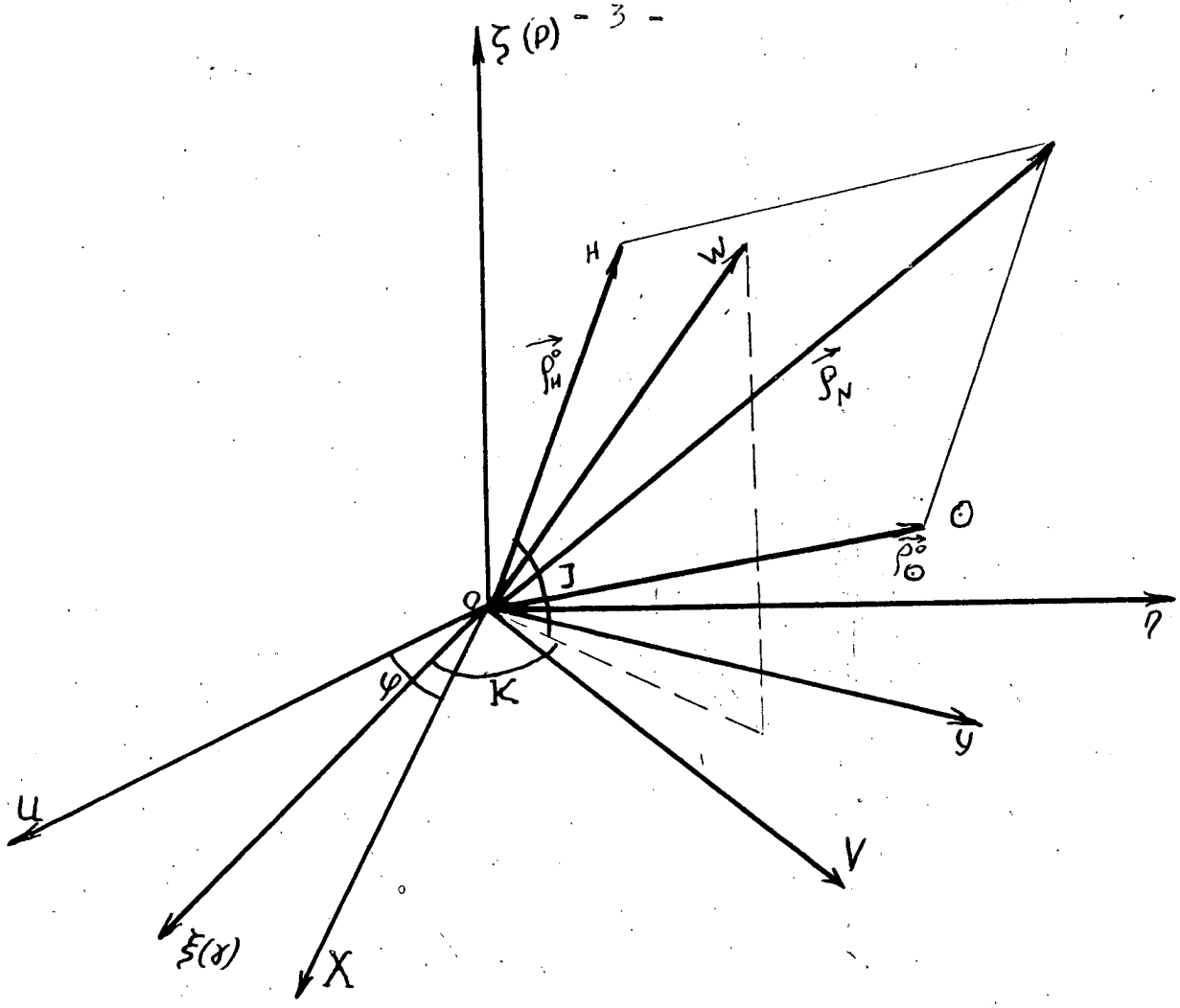
b) The axis of rotation is perpendicular to the axis of cillindre.

c) The body of a rocket does not scatter the solar light, but reflects it.

Let us choose three systems of rectangular coordinates as it is shown by figure.

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6



The centre of the rocket is in the origin of the coordinate systems.

$O\xi\eta\zeta$ - equatorial system

OW - axis of rotation.

OXYW - the system which is connected with the body of the rocket. OX - is the direction of the axis of cillindre. The angle φ between OU and OX is in the equatorial plane of the rocket.

Vector $\vec{\rho}^{\circ}_{\odot}$ directed to the sun. Vector $\vec{\rho}^{\circ}_{H}$ directed to the observer. Vector $\vec{\rho}_N = \vec{\rho}^{\circ}_{\odot} + \vec{\rho}^{\circ}_{H}$ - is direction of the normal to the body of the rocket at the moment of light-

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6

maximum. Let us take $-\alpha_N$ u δ_N equatorial rocketocentric coordinates of the end of the vector $\vec{\rho}_N$.

So:

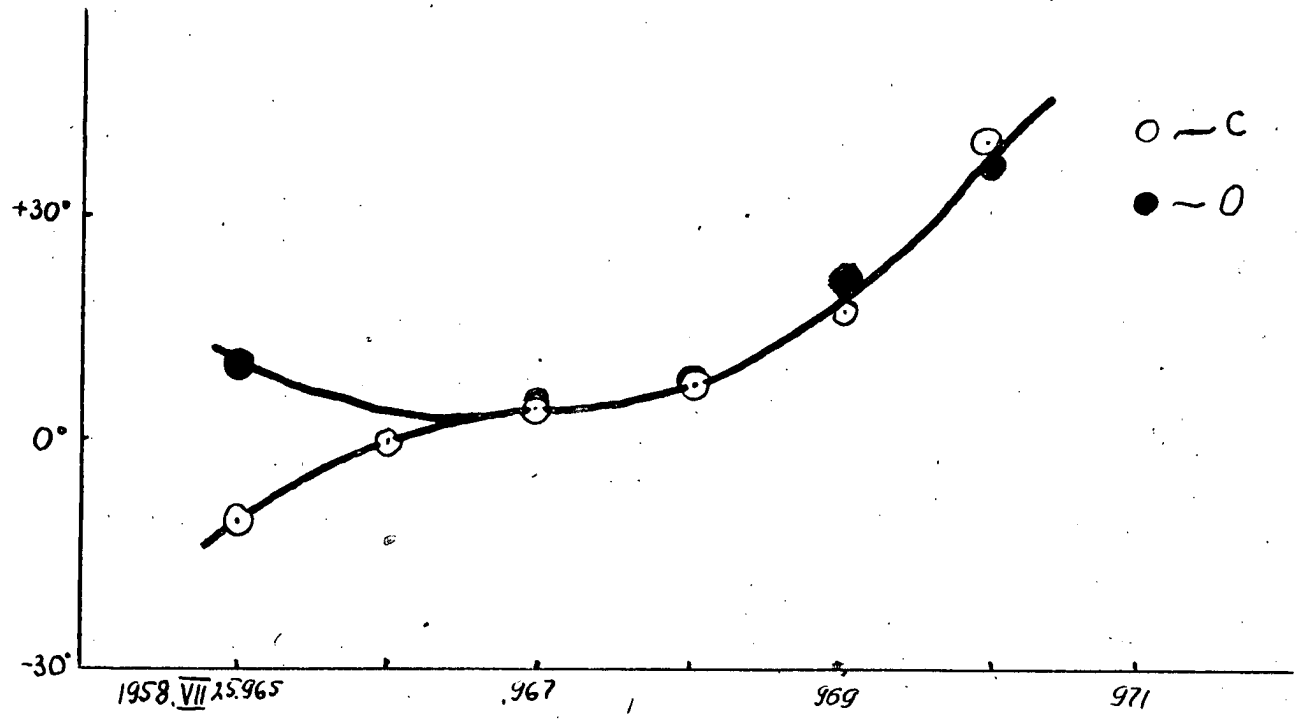
$$\operatorname{ctg}\varphi = \sin I \operatorname{ctg}(\alpha_N - k) - \cos I \cdot \operatorname{tg}\delta_N \operatorname{cosec}(\alpha_N - k)$$

where K and I equatorial coordinates of axis of rotation.

During the passage of the rocket 1958 July 25.96

$$k = 167^\circ;\ I = 21^\circ$$

The observed and computed values of the angle φ shown on the figure:



W. Zessewitsch

Approved For Release 2009/01/21 : CIA-RDP80T00246A005100520002-6